SYNOPSIS OF THE THESIS ENTITLED

QUALITY INPROVEMENT OF SPECIAL LIBRARIES IN KARNATAKA STATE: A SIX SIGMA APPROACH

SYNOPSIS OF THE THESIS SUBMITTED TO THE MANGALORE UNIVERSITY, MANGALORE FOR THE AWARD OF THE DEGREE OF

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1. INTRODUCTION

Business around the world until the 1950's focused on mass production and quantity, rather than quality much. After World War II, W. Edwards Deming (1986) helped the Japanese to revitalize their industries by focusing on quality. His approach became popularly as Total Quality Management (TQM). He introduced it as a more intelligent way to get better results, an approach, that reduced cost, improved customer satisfaction, and facilitated greater growth and profitability.

The successful impact of TQM on Japanese industries forced the U.S. businesses to take a new look at it. By 1980's, many business leaders began to see Deming's point for improvement in quality. It uses statistics, teamwork, and process control would lead to continuous improvement, higher quality, and lower costs. Those companies that adopted TQM underwent major changes. Quality became the focus and the name of the game. By the mid-1980's, however, some industries in business community had become impatient and disenchanted with TQM. Continuous improvement is worthwhile, of course, but it wasn't producing the great financial results as many had expected. Six Sigma approach offers the solution. This was not a rejection of TQM, but a refinement of it to introduce a methodology for achieving results more systematically.

Six Sigma approach was initially developed at the Motorola Inc. USA, for systematic improvement of processes by eliminating defects (Motorola University, 1990). A defect is defined as nonconformity of a product or service to its

specifications. The term "Six Sigma" refers to the ability of highly capable processes which ensures to produce output as per specification. While the particulars of the approach were originally formulated by the Bill Smith at Motorola in 1986, (Motorola University, 1990) Six Sigma was inspired by six preceding decades of quality improvement process which included methods, such as quality control, TQM, and Zero Defects.

In 1989 Motorola set a five-year goal: a defect rate of 3.4 parts per million—a quality level of Six Sigma, essentially as near perfection as one can get in terms of process outputs. The success of Motorola's Six Sigma initiative changed American concepts of quality and the means of measuring it. Other companies noticed success of Motorola which led to the revolution of Six Sigma. Six Sigma is a disciplined extension of TQM, it is more focused approach. It concentrates on the few vital processes—those that contribute the most to the cost of products, services and their quality. It uses business metrics to identify those vital processes, connecting quality to cost. This is how Six Sigma generates profit. The effectiveness of Six Sigma to a large extent depends on use of its tool to Define, Measure, Analyze, Improve, and Control (DMAIC) processes (Brue, 2006).

The increasing demand for high-quality products and highly capable business processes, by large organizations has left no choice on the Indian industry, but to consider the introduction of Six Sigma approach. Most companies in India have applied Six Sigma approach (Daftari & Palande, 2007). Some

prominent practitioners of Six Sigma processes are ICICI Bank, Imperial Tobacco Company of India (ITC) and Reliance Industries. Also whole host of BPOs like ICICI OneSource and Wireless Network Service (WNS) have adopted Six Sigma processes as part of the service level agreements. In the study made by (Dutta, 2004) on Indian ICT firms and their approaches to Six Sigma realised the need to improve the profile in the market. Most of the firms in the Indian ICT industry irrespective of their size have now begun to understand the importance of improvement in quality of products and services entering the market. Top-level management of the major Indian ICT firms specializing in different areas have made their own teams to identify and understand customer needs and have designed various pathways towards TQM. Better R&D and innovation activities are expected to strengthen the capability of a firm to easily sustain it in the market through increased quality control.

"Better understanding of the problem from all facets, qualitatively as well as quantitatively, and laying out the improvements through effective analysis of the roots of the problem is possible with the implementation of Six Sigma approach" (Desai, 2006). He concluded that a small scale unit has set up a dedicated industrial engineering department to implement and maintain the improvement measures laid down. The target set for improvement, that is, allowing 50% less quantity to be delayed, fetched multiple benefits to the concern, such as, converting developmental products into regular production, taking up

new products development and expanding customer bases. In an industrial application, the customers will include the purchasers of the product or service, suppliers, subcontractors, etc. Likewise, a careful identification of the customers in the educational setup needs to be accomplished.

Study on Six Sigma in education by (Patil, Kamlapur, & Dhore, 2006) said, Six Sigma approach in imparting knowledge of literacy with quality, the thinking, writing and presentation skills of the students can be improved and with this results can also be improved. It infuses a spike of excellence, emotional development, humaneness and self-discipline. The clients are the students and the excellence of learning they achieve is the service. It was concluded that Six Sigma approach addresses leadership, data management, projects and activities, training and infrastructure issues. In the study of (Dong-Suk, 2006) introduced Six Sigma approach and concluded that Libraries in the process of applying Six Sigma must perceive the factor that satisfies users as an ideal quality and try to find key factors that affect quality from users' point of view.

Libraries are made to collect objective, reliable data and employ methods of statistic analysis in order to gather data and information within the organization and use them for decision-making. As a characteristic of library service, there are generally distributed factors which are impossible to quantify. Therefore, it is necessary to consider those aspects which are difficult to quantify, such as the current services and users' expectations. Accordingly, in drawing and

implementing improvement plans, it is needed to prepare a process model separately or the field of library management, which is different from general manufacturing. In this study, Six Sigma approach will be used in order to review various aspects of library management, conduct evaluation and find a service process necessary for improvement to raise user satisfaction. In addition, it suggests what should be done in the future in association with strategies and visions for the library management.

2. SIGNIFICANCE OF THE STUDY

In the resource scarce environment introducing technology, maintaining quality and increasing access is the biggest problem which needs serious attention for library professionals. Unless the library management system is reorganized and reoriented, it is difficult to overcome them. Serious rethinking on every task and improving the educational process in terms of measurable and definable criteria of library management systems is urgently needed. Innovative supporting which helps in improving the quality of process and structures pertaining to planning, designing, developing and delivery of instructional materials are needed. One such powerful quality tool is application of the Six Sigma approach which is widely used in manufacturing and service organizations. This approach with its understanding, training and implementation will help the libraries in reducing cost of the resources, improving services, reducing defects and

improving work culture. Such libraries would definitely meet the challenges of quality.

Large numbers of special libraries are functioning in Karnataka state, under central government, and reputed organizations. These special libraries are facing many problems due to shortage of useful models to integrate some of the more efficient innovative problem-solving techniques into an effective process improvement strategy, for a more complete methodology that will aid in maintaining a competitive edge. The studies conducted so far do not provide individual or collectively sufficient criteria for defining the approach of Six Sigma and its importance on special libraries in Karnataka. Most of the studies are either theoretical in nature or based on personal experience and knowledge. No systematic study has been carried out for special libraries in Karnataka. Consequently, there is no such study that can provide a reliable base for exploring general conclusion about the Six Sigma in the special libraries through which one can proceed to generalize the Six Sigma approach in India.

There have been a number of studies on application of Six Sigma approach in service industry carried out in developed countries by drawing data in all types of industries. Such studies are less in a country like India and also no such study has been carried out in Karnataka region, where a strong cluster of special libraries exists. This conclusion is arrived after an extensive literature survey of the studies on the special libraries located in Karnataka.

The purpose of study is to find out the existing work culture and improve the same in the special libraries and to identify how the Six Sigma benefits the different sections of libraries. It aims to develop Six Sigma approach in the special libraries and to give recommendations on necessary measures to efficiently implement Six Sigma in the sections like resources management, user satisfaction, and personnel management using DMAIC methodology. To fulfill the purpose three kinds of studies will be taken up viz., discussion, observation, and questionnaire survey.

3. STATEMENT OF THE PROBLEM

Special libraries should pay serious attention to introduce technology, improve quality and increase the access to resources and services, in an environment where already there is a scarcity of resources. Unless reorganization and reorientation of the libraries, it is difficult to overcome the challenges. Serious rethinking in the direction of improving the user's expectations in terms of measurable supporting tools which helps in improving the quality of resources and services, the structures pertaining to planning, designing, developing of resources and services are urgently needed. One such powerful tool to quantify quality is the Six Sigma which is widely used in manufacturing and service organizations. Six Sigma is an approach that offers the libraries with a change in paradigm thinking, culture and performance. In this view, the topic chosen for the

study is "QUALITY IMPROVEMENT OF SPECIAL LIBRARIES IN KARNATAKA STATE: A SIX SIGMA APPROACH"

4. POPULATION OF THE STUDY

Special libraries located in Karnataka are being considered as the population of the study. All the libraries are chosen as a sample size of the population. These libraries are categorized according to the IFLA guidelines of division of special libraries as Government libraries, Social Science libraries, Geography and Technology libraries, Health and Bioscience libraries, Art libraries, Genealogy and Local History libraries, and Law libraries (IFLANET, 2008). In view of the above division of the libraries cluster sampling technique is being used in the study.

5. OBJECTIVES OF THE STUDY

1. To define the current state of the available of quality and the importance of Six Sigma approach in the libraries

2. To identify how the approach of Six Sigma would bring the improvement in the library management and services

3. To study the impact of Six Sigma approach in
    a. Information resource management
    b. Users satisfaction
    c. personnel management

4. To suggest a sample model using DMAIC tool of Six Sigma approach for the special libraries

5. To study the views of librarians on Six Sigma approach

6. To identify areas for further studies.

6. HYPOTHESES

1. The concept of Six Sigma may be used to quantify and evaluate in the special libraries

2. Special libraries in Karnataka have not responded to the changes in quality management

3. Staff in the special libraries in Karnataka are not fully aware of Six Sigma approach

4. Special libraries in Karnataka have not applied Six Sigma approach

5. The Six Sigma model evaluated through this study is helpful in successful management of special libraries

7. METHODOLOGY

Six Sigma approach is improvement technique that uses statistical and non-statistical analysis to identify and deal with problems and opportunities in system. The approach assists in the identifying hidden costs and the optimization of resources, simultaneously aiming for enhancement of user satisfaction. The statistical representation of Six Sigma describes quantitatively how a process is performing. To achieve Six Sigma, a process must not produce more than 3.4 defects per million opportunities. A Six Sigma defect is defined as anything outside of customer specifications. A Six Sigma opportunity is then the total quantity of chances for a defect. Six Sigma has two key methodologies: (Feo and Barnard, 2005) Define, Measure, Analyze, Improve, and Control (DMAIC) and Define, Measure, Analyze, Design, and Verify (DMADV), both inspired by W. Edwards Deming's Plan-Do-Check-Act Cycle: DMAIC is used to improve an existing process of management, and DMADV is used to create new product or process designs for

predictable, defect-free performance. Hence, to fulfill the objectives, an effort is made to evolve a DMAIC methodology.

Define: This is the first phase of the Six Sigma methodology. In the define phase users and their requirements will be defined. Efforts will be made to define services offered by the library in order to make these more efficiently using critical to success factors like customer focus, clear performance metrics, and organizational understanding of work process.

Measure: In the subsequent measure phase the current position of the special libraries will be determined and data will be collected using questionnaire. In the study two questionnaires will be prepared separately, one for the Head of the library and the other for the users to ascertain the few vital root causes. During the measurement process the critical to quality characteristics like time (service time, waiting time, and cycle time), cost, employee behaviour, and information (accurate and timely information).

Analyse: In this phase data will be analysed to find out the potential sources of variation and reduce the number of process variables to be acted in the improvement phase. Once the number of process variables identified, ANOVA and hypotheses test will be frequently used. The major steps followed in the analyse is as: The results will be statistically and precisely defined in terms of the mean, standard deviation or regularity; Second the gap between the objectives and

actual state in reality will be clearly defined based on minimizing variance and moving average; Third comprehensive list of the potential causes of the problems will be produced; Fourth and final step statistical analyse will be carried out using palette chart, regressive analysis, root cause analysis, and fish bone diagrams to reduce the listed items for potential causes, into a few key factors.

Improve: In this phase the root cause of the problem confirmed in the previous analysis will be removed and the solution is standardized. To ensure that the solutions are effective, the output is measured continuously to monitor the extent of improvement.

Control: Controlling the process, efforts will be made that defects do not recur, removes the root cause of the problem. All the possible related problems of a problem, identified in the analysis phase would be tackled in the control phase. Suggestions will be given for reallocation of resources to ensure the process continues in a new path of optimisation.

8. THESIS STRUCTURE

The chapters of the thesis are outlined below.

Chapter 1: Introduction

In this chapter efforts will be made to introduce the theme of research, present the background and need of the study, statement of the problem, Objectives, Hypothesis, and contribution to research.

Chapter 2: Review of Literature

In this chapter all of the research that has been done on the research areas of the thesis will be presented.

Chapter 3: Materials and Methods

This chapter will provide an in-depth discussion of materials. The methods part of this chapter will be carefully and methodically discuss the methods that are going to be used in the study.

Chapter 4: Results

This chapter covers the narrative presentation of findings and also statistics, tables, Figures, etc. that show what the specific findings of study are.

Chapter 5: Data analysis and Discussion

This chapter begin with a concise restatement of study's purpose along with any needed background information. Each hypothesis will be restated. Based on results presented in the previous chapter, will be discussed based on what, specifically, do the results mean? How can they be interpreted? Can they be interpreted in multiple ways? And what do the findings tell about hypothesis?

Chapter 6: Model of DMAIC methodology

Based on the results in this chapter a model of DMAIC methodology in library management systems will be developed.

Chapter 7: Findings and recommendations

This chapter summarise the results and discussion. It includes a list of the most important findings of the study in descending order of importance. Statement about the possibility of future study will be provided.

9. SCOPE AND LIMITATIONS OF THE STUDY

The study aims to apply Six Sigma approach in special libraries. A peripheral attempt will also be made to know the impact of Six Sigma in different sections of library like, information resource management, users need and satisfactions, and personnel management. The study is restricted to the special libraries in the Karnataka state, India, and other types of libraries are excluded from this study.

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